PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent
appln. of: Michio HORIUCHI
et al.

Serial No: 09/826,512

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For: **WIRING SUBSTRATE, METHOD OF MANUFACTURING SAME, AND SEMICONDUCTOR DEVICE**

Examiner: Jose H. Alcala

Art Unit: 2841

Docket No.: 089-01

CERTIFICATE OF MAILING
DATE OF DEPOSIT: February 25, 2002
I hereby certify that this correspondence is being deposited with the United States Postal Service, postage paid, as first class mail under 37 C.F.R. §1.8, on the date indicated above and is addressed to Box Non-fee Amendment, Commissioner for Patents, Washington D.C. 20231.

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Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

This preliminary amendment relates to the above-reference patent application. Kindly enter this preliminary amendment prior to examination on the merits of the above-identified application.

Please enter the following amendment without prejudice:

IN THE SPECIFICATION:

Amend the specification as follows:

Replace the paragraph beginning at page 8, line 16, and bridging pages 8 and 9, with the following:

--A packaging substrate which is also referred to as a "base material" herein may be a conventional substrate or an improved

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substrate thereof. As suitable base materials, there are, for example, a hard resin substrate, a metal substrate, a ceramic substrate, and a printed substrate. The hard resin substrate includes, for example, a substrate prepared from a resin reinforced with a reinforcing material like a glass fiber, a Kevlar™ resin, etc., and a substrate prepared from a glass polyimide resin, a glass epoxy resin, a glass bismaleiimide triazine (BT), a glass polyphenylene ether (PPE) resin, etc. The metal substrate comprises a base material such as aluminum, iron, or copper, having applied thereon via an organic insulation film (for example, a polyimide resin, an epoxy resin, etc.) a circuit pattern. Specifically, they include an IMS substrate, a metal core substrate, and an enamel substrate. The ceramic substrate is a base material of a high-purity fine ceramic, on which a circuit pattern has been formed. As suitable ceramic substrates, there are an alumina (aluminum oxide) substrate, an AIN substrate (an aluminum nitride substrate), and a low-temperature sintered substrate. The printed substrate includes various substrates having a circuit pattern formed on them based on a print wiring technique. As a typical example of such substrates, there is a built-up substrate. The built-up substrate is a multi-layer printed wiring substrate having conductive layers and insulation layers sequentially laminated on the base material by plating or screen printing, as is known.--

Replace the paragraph beginning at page 30, line 34, and bridging pages 30 and 31, with the following:

--In the wiring substrate 10 shown in Fig. 9, a high-elasticity underlayer 4 is formed in a predetermined film thickness on one surface of a rigid plastic base material 1. A low-elasticity underlayer 3 is formed on this high-elasticity underlayer 4 escaping from the region of an external-connection terminal 12. A rerouted wiring 17 and the external-connection terminal 12 are formed to cover the high-elasticity underlayer 4 and the low-elasticity underlayer 3.--

Replace the paragraph beginning at page 31, line 9, and ending at page 31, line 26, with the following:

--In the wiring substrate 10 shown in Fig. 10, a high elasticity underlayer 4 is formed in different film thicknesses on one surface of a rigid plastic base material 1. That is, the high-elasticity underlayer 4 is formed in a predetermined pattern so that the region corresponding to an external-connection terminal 12 has a large thickness and other regions have a small thickness. On the high-elasticity underlayer 4, a low-elasticity underlayer 3 is formed so that the total thickness of the high-elasticity underlayer 4 and the low-elasticity underlayer 3 becomes constant to match the largest thickness of the high-elasticity underlayer 4. The external-connection terminal 12 is formed on the high-elasticity underlayer 4. An electronic-part

mounting pad 16 and a rerouted wiring 17 are formed on the low-elasticity underlayer 3.--

Replace the paragraph beginning at page 31, line 27, and bridging pages 31 and 32, with the following:

--In the wiring substrate 10 shown in Fig. 11, a high-elasticity underlayer 4 is formed on one surface of a rigid plastic base material 1 in such a manner that the high-elasticity underlayer 4 is positioned only in the region beneath an external-connection terminal 12. Adjacent to the high-elasticity underlayer 4, a low-elasticity underlayer 3 is formed in a film-thickness distribution as shown in the drawing. That is, the low elasticity underlayer 3 has a large film thickness in the region beneath a electronic-part mounting pad 16 and a rerouted wiring 17, and at the same time, has a very small film thickness at the other portion beneath the high-elasticity underlayer 4. The total thickness of the composite underlayer of the high-elasticity underlayer 4 and the low-elasticity underlayer 3 is constant. The external-connection terminal 12 is formed on the high-elasticity underlayer 4. The electronic-part mounting pad 16 and the rerouted wiring 17 are formed on the low-elasticity underlayer 3.--

REMARKS

The changes made to the specification correct certain formal errors. On page 8, line 36, "aluminum" was corrected to

"alumina," which is the correct term for the ceramic aluminum oxide that is well known as a substrate material in the electronics industry. On page 31, lines 6 to 8; page 31, lines 24 to 26; and page 32, lines 8 to 10, the sentence referencing the via hole 15 was eliminated, because the via hole 15 does not appear in the illustrations of Figs. 9, 10, and 11. No new matter is introduced by this amendment. Marked-up versions of the replacement paragraphs, showing insertions underlined and deletions bracketed, are attached hereto for the Examiner's convenience.

Early and favorable action on the merits of the application is earnestly solicited.

Respectfully submitted,

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